Solid Waste Utilization Plan

For:		**Date:**	
Office:		**Field:**	
Assisted by:			

Step 1 **Resource Inventory**

- = no. of animals
- = avg. weight (lbs.)
- = no. of days/yr. waste produced
- = waste produced - lb/day/1000# (at 87 - 88% moisture)
- = as excreted moisture content (from Chapter 4 tables)
- = moisture content (%) from manure analysis

Steps 2 - 3d are used to approximate total manure produced when using as-excreted values.

Step 2 **Manure Production as Excreted**

Total Manure Produced (tons) = (no. animals x avg. wt/1000 x # days waste produced x waste produced)/2,000

Total Manure Produced= tons **0 tons**

Step 3 **Adjust Manure Production for Moisture Content**

Step 3a Calculate % Dry Matter "as excreted"

% dry matter = 100 - % moist. (as excreted)

% **100 %**

Step 3b **Calculate dry matter production.**

Dry matter production = Total Manure Produced x % dry matter from Step 3a

tons **0 tons**

Step 3c **Calculate Dry Matter % Moisture Content (as is)**

Calculate Manure Dry Matter "as is"

% dry matter = 100 - % moisture (as analyzed or as is)

% dry matter **100 % dry matter**

Step 3d **Calculate Production at Given Moisture Content (as is)**

Production at given moisture content =

Dry matter production + [Dry matter production x (moisture content/dry matter % as is)]

tons **0 tons**

Step 4 **Manure Analysis** - Nitrate - N, Ammonia - N, Organic - N, P, and K as lbs. per ton.

NO_3 - N	Amm. - N	Org. N	P_2O_5	K_2O

If the lab analysis for P and K are not expressed as the oxidized forms (P_2O_5 and K_2O) then convert using: P_2O_5 = P x 2.29 K_2O = K x 1.21

Step 5a **Total Nutrients Produced**

Total Nutrients Produced = lbs nutrient/ton (from Step 4) x tons manure produced (from Step 3d)

NO_3 - N =		lbs	0 lbs.
Ammonia - N =		lbs	0 lbs.
Org. - N =		lbs	0 lbs.
P_2O_5 =		lbs	0 lbs.
K_2O =		lbs	0 lbs.

Step 5b **Economic Value of Nutrients Produced (assumes 45% mineralization rate of organic nitrogen)**

Economic Value = Cost ($) per lb of nutrient if commercially applied

Nitrogen =		$ per pound
Phos. =		$ per pound
Potass. =		$ per pound

Nitrogen Value =		$	0 $
Phosphorous Value =		$	0 $
Potassium Value =		$	0 $

Step 6 **Plant Available Nutrients (availability due to mineralization)**

(multiply the mineralization percentages by the values from Step 4)

	NO_3 - N = NO_3 lbs. X 100% =		lbs./ton	0.0 lbs./ton
	NH_4 - N = NH_4 lbs. X 100% =		lbs./ton	0.0 lbs./ton
AWMFH	Org. N = N lbs. X 45% =		lbs./ton	0.0 lbs./ton
Table 11-9	P_2O_5 = P_2O_5 lbs. X 90% =		lbs./ton	0.0 lbs./ton
& CSU Data	K_2O = K_2O lbs. X 95% =		lbs./ton	0.0 lbs./ton

Mineralization values assume annual applications on the same site. If a one time, application, modify values as per instruction in Table 11-9, AWMFH.

Step 7 **Plant Available Nutrients (availability after application losses)**

Application Method	Soil Conditions	Days to Incorporation

Percentage of ammonia and mineralized organic nitrogen retained based upon described conditions.

	%	Step 6 Nitrogen value x Percentage Retained =	
			lbs./ton

Step 8 **Pounds of available nutrients per ton of waste (after mineralization and application losses)**

Nitrogen	P_2O_5	K_2O

Nitrogen	P_2O_5	K_2O
0	0	0

Step 9 **Nutrients Required By Crop**

Required Crop Inventory

Crop	Realistic Yield Goal	Acres

Required Soil Analysis Inventory

PPM NO_3-N	PPM - P	PPM - K	% OM

Step 10 **Crop #1 Nutrient Requirements**

Crop	Nutrient	Requirement (lb./ac)
0	Nitrogen	
0	P_2O_5	
0	K_2O	

Crop #2 Nutrient Requirements

Crop	Nutrient	Requirement (lb./ac)
0	Nitrogen	
0	P_2O_5	
0	K_2O	

Crop #3 Nutrient Requirements

Crop	Nutrient	Requirement (lb./ac)
0	Nitrogen	
0	P_2O_5	
0	K_2O	

Step 11 **Crop Nitrogen Requirement After Nitrogen Credit from Irrigation Water (Crop #1)**

2.7 x PPM NO_3^- x net acre-feet water applied = lbs. N/acre (insure conversion of acre-inches to acre-ft)

	=ppm NO_3-		
	=net inches water applied		
lbs. N/Acre =		lbs./ac	0 lbs./ac.
Adjusted Crop #1 Nitrogen Req.=		lbs./ton	0 lbs./ac.

(Crop #1 Nitrogen Requirement (from step 10) - N from irrigation water)

Crop Nitrogen Requirement After Nitrogen Credit from Irrigation Water (Crop #2)

Adjusted Crop #2 Nitrogen Req.= lbs./ton — No Crop lbs./ac.

(Crop #2 Nitrogen Requirement (from step 10) - N from irrigation water)

Crop Nitrogen Requirement After Nitrogen Credit from Irrigation Water (Crop #3)

Adjusted Crop #3 Nitrogen Req.= lbs./ton — No Crop lbs./ac.

(Crop #3 Nitrogen Requirement (from step 10) - N from irrigation water)

Step 12 **Crop Nitrogen Requirement After Nitrogen Credit from Previous Legume (Crop #1)**

Use only if legume part of rotation since last soil test. If no legume, use 0 (zero).
Above 6,000 feet elevation, use 30 lbs/acre of symbiotically fixed nitrogen
Below 6,000 feet elevation, use 40 lbs/acre of symbiotically fixed nitrogen

lbs. N/Acre fixed =		lbs./ac	0 lbs./ac
Adjusted Crop #1 Nitrogen Req.=		lbs./ton	0 lbs./ac

(Crop #1 Nitrogen Requirement (from step 11) - N from legume fixation

Crop Nitrogen Requirement After Nitrogen Credit from Previous Legume (Crop #2)

Adjusted Crop #2 Nitrogen Req.=		lbs./ton	No Crop lbs./ac

(Crop #2 Nitrogen Requirement (from step 11) - N from legume fixation

Crop Nitrogen Requirement After Nitrogen Credit from Previous Legume (Crop #3)

Adjusted Crop #3 Nitrogen Req.=		lbs./ton	No Crop lbs./ac

(Crop #3 Nitrogen Requirement (from step 11) - N from legume fixation

Step 13 **Calculate Nitrogen-based Manure Application Rates (Crop #1)**

(from step 12) Crop Nitrogen Needs =		lbs./ac	0 lbs./ac.
(from step 8) Available N in Manure =		lbs./ton	0 lbs./ton

N-based Application Rate = Crop N Needs (lbs/ac) x Available N (tons/lb.) =

	tons/ac	#DIV/0! tons/ac

Calculate Nitrogen-based Manure Application Rates (Crop #2)

Crop Nitrogen Needs =		lbs./ac	No Crop lbs./ac.
Available N in Manure =		lbs./ton	No Crop lbs./ton

N-based Application Rate = Crop N Needs (lbs/ac) x Available N (tons/lb.) =

	tons/ac	No Crop tons/ac

Calculate Nitrogen-based Manure Application Rates (Crop #3)

Crop Nitrogen Needs =		lbs./ac	No Crop lbs./ac.
Available N in Manure =		lbs./ton	No Crop lbs./ton

N-based Application Rate = Crop N Needs (lbs/ac) x Available N (tons/lb.) =

	tons/ac	No Crop tons/ac

Step 14 **Calculate Phosphorous-based Manure Application Rates (Crop #1)**

(from step 10) Crop Phosphorous Needs =		lbs./ac	0 lbs./ac.
(from step 8) Available P_2O_5 in Manure =		lbs./ton	0 lbs./ton

P_2O_5-based App. Rate = Crop P_2O_5 Needs (lbs/ac) x Avail. P_2O_5 (tons/lb.) =

	tons/ac	#DIV/0! tons/ac

Calculate Phosphorous-based Manure Application Rates (Crop #2)

Crop Phosphorous Needs =		lbs./ac	No Crop lbs./ac.
Available P_2O_5 in Manure =		lbs./ton	No Crop lbs./ton

P_2O_5-based App. Rate = Crop P_2O_5 Needs (lbs/ac) x Avail. P_2O_5 (tons/lb.) =

	tons/ac	No Crop tons/ac

Calculate Phosphorous-based Manure Application Rates (Crop #3)

Crop Phosphorous Needs =		lbs./ac	No Crop lbs./ac.
Available P_2O_5 in Manure =		lbs./ton	No Crop lbs./ton

P_2O_5-based App. Rate = Crop P_2O_5 Needs (lbs/ac) x Avail. P_2O_5 (tons/lb.) =

	tons/ac	No Crop tons/ac

Step 15 **Calculate Potassium-based Manure Application Rates (Crop #1)**

(from step 10) Crop Potassium Needs = _____ lbs./ac → 0 lbs./ac.

(from step 8) Available K_2O in Manure = _____ lbs./ton → 0 lbs./ton

K2O-based App. Rate = Crop K2O Needs (lbs./ac) x Avail. K2O (tons/lb.) =

_____ tons/ac → #DIV/0! tons/ac

Calculate Potassium-based Manure Application Rates (Crop #2)

Crop Potassium Needs = _____ lbs./ac → No Crop lbs./ac.

Available K_2O in Manure = _____ lbs./ton → No Crop lbs./ton

K2O-based App. Rate = Crop K2O Needs (lbs./ac) x Avail. K2O (tons/lb.) =

_____ tons/ac → No Crop tons/ac

Calculate Potassium-based Manure Application Rates (Crop #3)

Crop Potassium Needs = _____ lbs./ac → No Crop lbs./ac.

Available K_2O in Manure = _____ lbs./ton → No Crop lbs./ton

K2O-based App. Rate = Crop K2O Needs (lbs./ac) x Avail. K2O (tons/lb.) =

_____ tons/ac → No Crop tons/ac

Step 16 **Calculate Approximate Acres of Crop #1 Needed**

Total Manure Produced (from Step 3d) (tons)/Application Rate (from Step 13, 14 or 15)

Nitrogen-based = Tons Manure (Step 3d)/N-based App. Rate (Step 13) = #DIV/0! acres

Phosphorous-based = Tons Manure (Step 3d)/P-based App. Rate (Step 14) = #DIV/0! acres

Potassium-based = Tons Manure (Step 3d)/K-based App. Rate (Step 15) = #DIV/0! acres

Nitrogen-based = _____ acres

Phosphorous-based= _____ acres

Potassium-based = _____ acres

Calculate Approximate Acres of Crop #2 Needed

Total Manure Produced (from Step 3d) (tons)/Application Rate (from Step 13, 14 or 15)

Nitrogen-based = Tons Manure (Step 3d)/N-based App. Rate (Step 13) = No Crop acres

Phosphorous-based = Tons Manure (Step 3d)/P-based App. Rate (Step 14) = No Crop acres

Potassium-based = Tons Manure (Step 3d)/K-based App. Rate (Step 15) = No Crop acres

Nitrogen-based = _____ acres

Phosphorous-based= _____ acres

Potassium-based = _____ acres

Calculate Approximate Acres of Crop #3 Needed

Total Manure Produced (from Step 3d) (tons)/Application Rate (from Step 13, 14 or 15)

Nitrogen-based = Tons Manure (Step 3d)/N-based App. Rate (Step 13) = No Crop acres

Phosphorous-based = Tons Manure (Step 3d)/P-based App. Rate (Step 14) = No Crop acres

Potassium-based = Tons Manure (Step 3d)/K-based App. Rate (Step 15) = No Crop acres

Nitrogen-based = _____ acres

Phosphorous-based= _____ acres

Potassium-based = _____ acres

Step 17 **Spreader Calibration (density of manure must be known) and Loads per Acre by Crop**

Provided by producer

	= length of spreader (ft)	
	= width of spreader (ft)	http://www.ext.colostate
	= depth of spreader (ft)	
	= density of manure (lbs/cu*ft)	

FOTG Practice 313 Waste Storage Structure

Vol. capacity of spreader = length x width x depth =

Vol. of Spreader =		cu ft	N/A	cu ft
Convert to lbs. = volume x density of manure (lbs/cu ft) =				
		lbs/load	N/A	lbs/load
		tons/load	N/A	tons/load

Loads/acre (Crop #1) = application rate(tons/acre) x loads/ton (spreader capacity) =

Nitrogen-based =		loads/acre	N/A	loads/acre
Phosphorous-based=		loads/acre	N/A	loads/acre
Potassium-based =		loads/acre	N/A	loads/acre

Loads/acre (Crop #2) = application rate(tons/acre) x loads/ton (spreader capacity) =

Nitrogen-based =		loads/acre	N/A	loads/acre
Phosphorous-based=		loads/acre	N/A	loads/acre
Potassium-based =		loads/acre	N/A	loads/acre

Loads/acre (Crop #3) = application rate(tons/acre) x loads/ton (spreader capacity) =

Nitrogen-based =		loads/acre	N/A	loads/acre
Phosphorous-based=		loads/acre	N/A	loads/acre
Potassium-based =		loads/acre	N/A	loads/acre

Step 18 **Recommended Timing of Application**

Step 19 **Operation and Maintenance**

Step 20 **Additional Specification and Notes**

I have reviewed the attached Waste Utilization Plan, and agree to apply as specified:

Producer Signature _____

Date _____